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COMPARISON OF INDIAN AND OVERSEAS STANDARDS FOR IRON CASTINGS

PART 2 SPHEROIDAL OR NODULAR GRAPHITE IRON CASTINGS

(First Revision)

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COMPARISON OF INDIAN AND OVERSEAS STANDARDS FOR IRON CASTINGS

PART 2 SPHEROIDAL OR NODULAR GRAPHITE IRON CASTINGS

(First Revision)

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Indian Standard

COMPARISON OF INDIAN AND OVERSEAS STANDARDS FOR IRON CASTINGS

PART 2 SPHEROIDAL OR NODULAR GRAPHITE IRON CASTINGS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (Part 2) (First Revision) was adopted by the Indian Standards Institution on 26 December 1985, after the draft finalized by the Pig Iron and Cast Iron Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard was first published in 1966. The Committee decided to revise the standard in view of the fact that most of the overseas standards covered have been revised.

0.2.1 Indian Standards Institution has formulated specification for different types of iron castings used in the industry. It was, therefore, decided to publish comparison on Indian and overseas standards for various types of iron castings in separate parts so as to facilitate users and manufacturers to take full advantage of it.

0.3 This standard is the second in series and covers the comparison of Indian and overseas standards for spheroidal or nodular graphite iron castings.

0.3.1 The comparison as given in this standard is primarily based on the proof stress and percentage elongation.

0.3.2 This comparison includes Indian (IS), International (ISO), British (BS), German (DIN), French (AFNOR), Swedish (SIS), American (ASTM), Italian (UNI), Czechoslovakian (CSN) and Japanese (JIS) Standards for spheroidal or nodular graphite iron castings.

0.4 The comparison represents the position with regard to Indian (IS), International (ISO), British (BS), German (DIN), French (AFNOR), Swedish (SIS), American (ASTM), Italian (UNI), Czechoslovakian (CSN) and Japanese (JIS) specifications existing at the time of publication.

1. SCOPE

1.1 This standard (Part 2) compares spheroidal or nodular graphite iron castings included in Indian Standard with International (ISO), British (BS), German (DIN), French (AFNOR), Swedish (SIS), American (ASTM), Italian (UNI), Czechoslovakian (CSN) and Japanese (JIS) standards (*see* Table 1).

TABLE 1 COMPARISON OF INDIAN AND OVERSEAS STANDARDS ON SPHEROIDAL OR NODULAR GRAPHITE IRON CASTINGS

(*Clause* 1.1)

Country/ International Organization	Standard No.	Grade	Tensile Strength *Min* MPa	0·2 Percent Proof Stress *Min* MPa	Elongation Percentage *Min* on Gauge Length of $5{\cdot}65\sqrt{S_o}$	Typical Hardness Value Range, Brinell (for Information Only)	Impact Value in Joule, Minimum at Room Temperature				Predominant Structural Constituent (for Information Only)
							V-Notch (Charpy)		U-Notch (Mesnager)		
							Mean value	Individual value	Mean value	Individual value	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
			GRADES COMPARABLE TO SG 370/17 OF IS : 1865-1974								
India	IS : 1865-1974	SG 370/17	370	230	17	179 *Max*	13	12	15	13	Ferrite
ISO	ISO 1083-1976	370/17	370	230	17	179 *Max*	13	11	15	13	do
UK	BS 2789 : 1973	370/17	270	230	17	179 *Max*	13	12	15	13	do
West Germany	DIN 1693-1973	GGG-35·3	350	219·6	22	—	19	17	—	—	do
France		GGG-40·3	400	250	18	—	16	14	—	—	do
Italy	NF A32-201-1976	FGS 370/17	370	230	17	179 *Max*	13	11	15	13	do
Sweden	UNI 4544-1974	GS 370/17	370	230	17	131-179	—	—	15	13	do
	SIS 140717-1977	07 17-15*	350-410	220-260	22-32	149 *Max*	—	—	—	—	—
USA	ASTM A 536-1980	60-40-18	414	276	18†	170 *Max*‡	—	—	—	—	—
Czechoslovakia	CSN 422303-1975	—	370	230	17	140-180	16§	14§	—	—	—
Japan	JIS G 5502-1975	—	—	—	—	—	—	—	—	—	—
			GRADES COMPARABLE TO SG 400/12 OF IS : 1865-1974								
India	IS : 1865-1974	SG 400/12	400	250	12	201 *Max*	—	—	—	—	Ferrite
ISO	ISO 1083-1976	400/12	400	250	12	201 *Max*	—	—	—	—	do
UK	BS 2789 : 1973	420/12	420	250	12	201 *Max*	—	—	—	—	do
West Germany	DIN 1693-1973	GGG-40	400	250	15	—	—	—	—	—	do
France	NF A32-201-1976	FGS 400/12	400	250	12	201 *Max*	—	—	—	—	do
Italy	UNI 4544-1974	GS 400-12	400	250	12	143-201	—	—	—	—	—
Sweden	SIS 140717-1977	07 17-12*	400-510	250-320	18-28	131-170	—	—	—	—	—
		07 17-12*	380-460	250-300	20-30	159 *Max*	—	—	—	—	—
USA	ASTM A536-1980	60-45-12	448	310	12†	156-217‡	—	—	—	—	—
Czechoslovakia	CSN 422304-1975	—	400	250	12	150-200	—	—	—	—	—
Japan	JIS G 5502-1975	FCD 40	392	255	15	120-197	—	—	—	—	—

GRADES COMPARABLE TO SG 500/7 OF IS : 1865-1974

India	IS : 1865-1974	SG 500/7	500	320	7	170-241	—	—	—	—	Ferrite and Pearlite
ISO	ISO 1083-1976	500/7	500	320	7	170-241	—	—	—	—	do
UK	BS 2789 : 1973	500/7	500	310	7	170-241	—	—	—	—	do
West Germany	DIN 1693-1973	GGG-50	500	320	7	—	—	—	—	—	do
France	NF A 32-201-1976	FGS 500/7	500	320	7	170-241	—	—	—	—	do
Italy	UNI 4544-1974	GS 500/7	500	320	7	170-241	—	—	—	—	do
Sweden	SIS 140727-1977	—	—	—	—	—	—	—	—	—	—
USA	ASTM A 536-1980	80-55-06	552	379	6†	187-255‡	—	—	—	—	Pearlitic
Czechoslovakia	CSN 422305-1975	—	500	320	7	170-240	—	—	—	—	—
Japan	JIS G 5502-1975	FCD 50	490	343	7	170-241	—	—	—	—	—
		FCD 45	441	294	10	143-217	—	—	—	—	—

GRADES COMPARABLE TO SG 600/3 OF IS : 1865-1974

India	IS : 1865-1974	SG 600/3	600	370	3	192-269	—	—	—	—	Pearlite and Ferrite
ISO	ISO 1083-1976	600/3	600	375	3	192-269	—	—	—	—	do
UK	BS 2789 : 1973	600/3	600	350	3	192-269	—	—	—	—	do
West Germany	DIN 1693-1973	GGG-60	600	380	3	—	—	—	—	—	do
France	NF A 32-201-1976	FGS 600/3	600	370	3	192-169	—	—	—	—	Pearlitic
Italy	UNI 4544-1974	GS 600/2	600	370	2	192-269	—	—	—	—	do
Sweden	SIS 140727-1977	0727-02‖	500-720	350-470	7-16	170-229	—	—	—	—	do
USA	ASTM A 536-1980	—	—	—	—	—	—	—	—	—	—
Czechoslovakia	CSN 422306-1975	—	600	370	3	190-270	—	—	—	—	—
Japan	JIS G 5502-1975	FCD 60	588	392	2	207-285	—	—	—	—	—

NOTE — For the detailed requirements of a standard, the original specification should be referred.

*Chemical composition, requirements, percent:

C 3·2-4·0, Si 2·8-1·5, Mn 0·05-1·0, P 0·08 *Max*, S 0·02 *Max*, Ni 0-2·0, Mg 0·02-0·08.

†Elongation on gauge length 50·8 mm ±0·125 mm.

‡Hardness value from 'SAE-J 434 C-75 Standard for automotive ductile iron castings'.

§Impact values in J/cm².

‖Chemical Composition requirements, percent:

C 3·2-4·0, Si 2·8-1·6, Mn 0·05-1·0, P 0·08 *Max*, S 0·02 *Max*, Ni 0-2·0, Mg 0·02-0·08.

(*Continued*)

TABLE 1 COMPARISON OF INDIAN AND OVERSEAS STANDARDS ON SPHEROIDAL OR NODULAR GRAPHITE IRON CASTINGS — *Contd*

Country/ International Organization	Standard No.	Grade	Tensile Strength *Min* MPa	0·2 Percent Proof Stress *Min* MPa	Elongation Percentage *Min* on Gauge Length of $5{\cdot}65\sqrt{S_0}$	Typical Hardness Value Range, Brinell (for Information Only)	Impact Value in Joule, Minimum at Room Temperature				Predominant Structural Constituent (for Information Only)
							V-Notch (Charpy)		U-Notch (Mesnager)		
							Mean value	Individual value	Mean value	Individual value	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
GRADES COMPARABLE TO SG 700/2 OF IS : 1865-1974											
India	IS : 1865-1974	SG 700/2	700	440	2	229-302	—	—	—	—	Pearlitic
ISO	ISO 1083-1976	700/2	700	420	2	229-302	—	—	—	—	do
UK	BS 2789 : 1973	700/2	700	400	2	229-302	—	—	—	—	do
West Germany	DIN 1693-1973	GGG-70	700	440	2	—	—	—	—	—	do
France	NF A 32-201-1976	FGS 700/2	700	420	2	229-302	—	—	—	—	do
Italy	UNI 4544-1974	GS 700/2	700	440	2	229-302	—	—	—	—	do
Sweden	SIS 140737-1977	0737-01*	700-960	450-610	3-7	229-302	—	—	—	—	do
	SIS 140732-1977	0732-03*	600-820	400-520	5-10	201-262	—	—	—	—	do
USA	ASTM A 536-1980	100-70-03	689	483	3†	241-302‡	—	—	—	—	—
Czechoslovakia	CSN 422307-1975	—	700	420	2	230-300	—	—	—	—	—
Japan	JIS G 5502-1975	FCD 700	686	441	2	229-321	—	—	—	—	—
GRADES COMPARABLE TO SG 800/2 OF IS : 1865-1974											
India	IS : 1865-1974	SG 800/2	800	480	2	248-352	—	—	—	—	Pearlite or tempered structure
ISO	ISO 1083-1976	800/2	800	480	2	248-352	—	—	—	—	do
UK	BS 2789 : 1973	800/2	800	460	2	248-352	—	—	—	—	do
West Germany	DIN 1693-1973	GGG-80	800	500	2	—	—	—	—	—	Pearlitic
France	NF A32-201-1976	FGS 800/2	800	480	2	248-352	—	—	—	—	Pearlite or tempered structure
Italy	UNI 4544-1974	GS 800/2	800	480	2	248-352	—	—	—	—	do
Sweden	SIS 140717-1977	—	—	—	—	—	—	—	—	—	—
USA	ASTM A 536-1980	120-90-02	827	621	2†	—	—	—	—	—	—
Czechoslovakia	CSN 422308-1975	—	800	480	2	250-350	—	—	—	—	—
Japan	JIS G 5502-1975	—	—	—	—	—	—	—	—	—	—

Note — For the detailed requirements of a standard, the original specification should be referred.

*Chemical composition, requirements, percent:

C 3·2-4·0, Si 2·8-1·6, Mn 0·05-1·0, P 0·8, *Max*, S 0-0·25 *Max*, Ni 0-2·5, Mg 0·02-0·08, *Max*.

†Elongation on gauge length 50·8 mm ± 0·125 mm.

‡Hardness values from 'SAE-J 434C-75 Standard for automotive ductile iron castings'.

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